

Analysis of the Influence of Thermodynamic Parameters on the Sensitivity of Bimetal Conduction Sensor in Temperature Measurement and Automatic Control Applications

ABSTRACT

The present study investigates the impact of thermodynamic parameters on the sensitivity of bimetal conduction sensors in temperature measurement and automatic control applications. Bimetal strips, composed of two distinct metals with varying coefficients of thermal expansion, exhibit curvature in response to temperature changes. This research examines the correlation between specific thermodynamic parameters, such as coefficient of thermal expansion and elastic modulus of the metals, and the resulting sensitivity of the bimetal sensor. Experimental analysis involves subjecting the sensor to controlled temperature variations and recording the corresponding curvature and mechanical response. The findings provide insights into the intricate relationship between the physical properties of the bimetal materials and their performance as sensors, enabling a deeper understanding of the underlying mechanisms that govern their behavior. This study contributes to enhancing the design and optimization of bimetal conduction sensors for accurate temperature measurement and reliable automatic control systems, with implications for various industrial and domestic applications.